FIG.1A

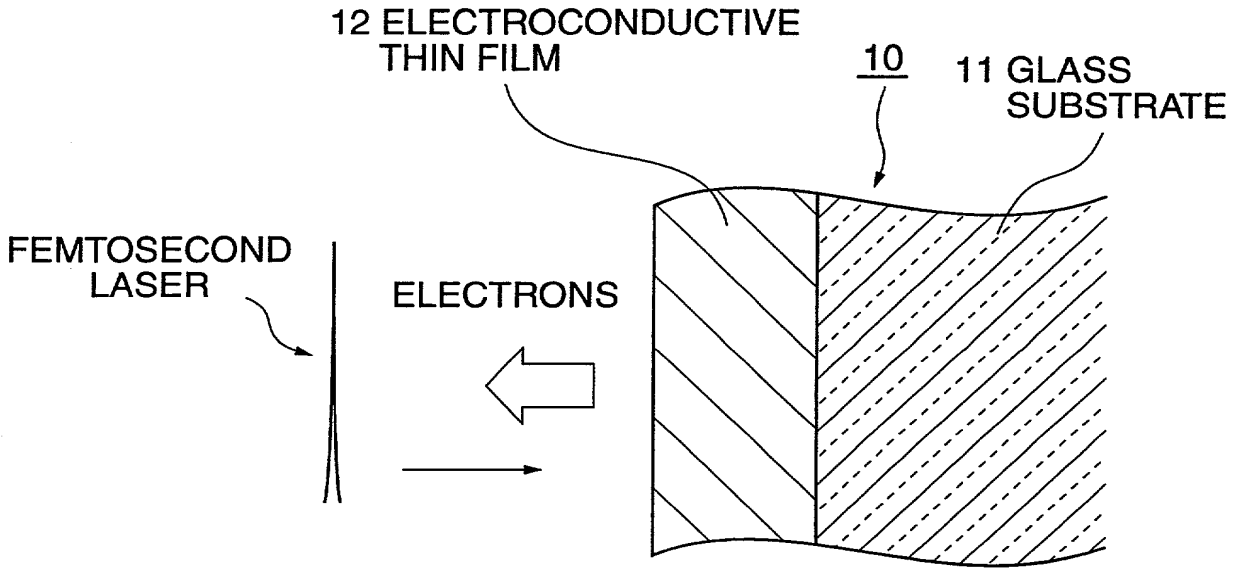

12 ELECTROCONDUCTIVE THIN FILM
10
11 GLASS SUBSTRATE
FEMTOSECOND LASER
ELECTRONS

FIG.1B

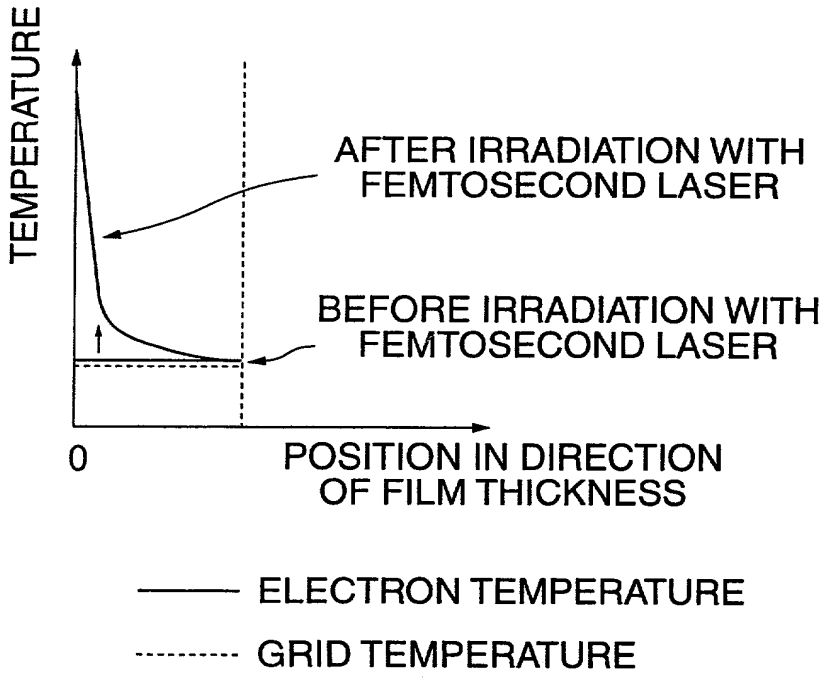

TEMPERATURE
AFTER IRRADIATION WITH FEMTOSECOND LASER
BEFORE IRRADIATION WITH FEMTOSECOND LASER
0
POSITION IN DIRECTION OF FILM THICKNESS
ELECTRON TEMPERATURE
GRID TEMPERATURE

FIG.2A

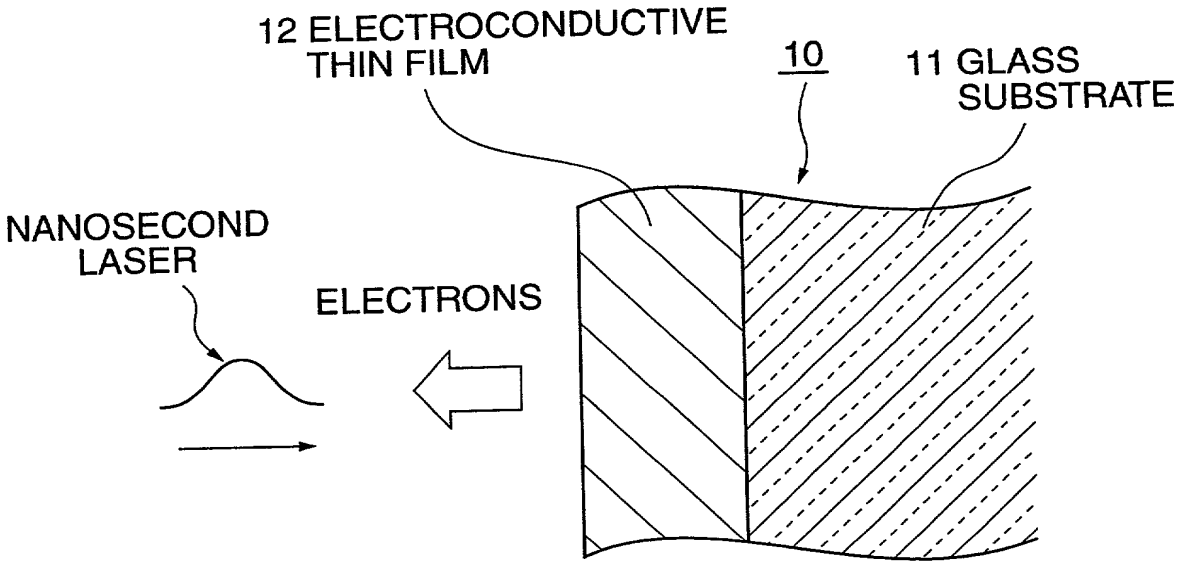

12 ELECTROCONDUCTIVE THIN FILM
10
11 GLASS SUBSTRATE
NANOSECOND LASER
ELECTRONS

FIG.2B

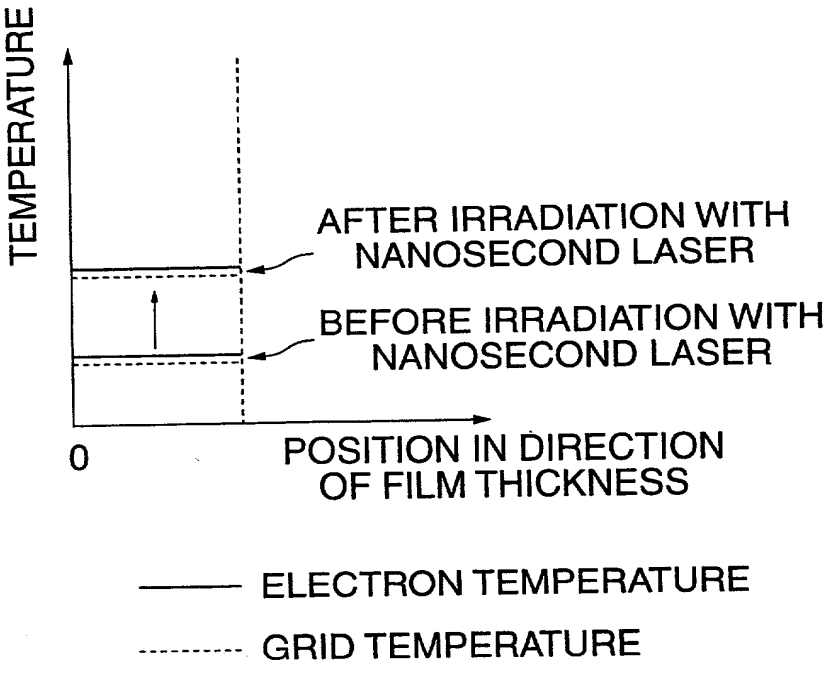

TEMPERATURE
AFTER IRRADIATION WITH NANOSECOND LASER
BEFORE IRRADIATION WITH NANOSECOND LASER
0
POSITION IN DIRECTION OF FILM THICKNESS
ELECTRON TEMPERATURE
GRID TEMPERATURE

FIG.3

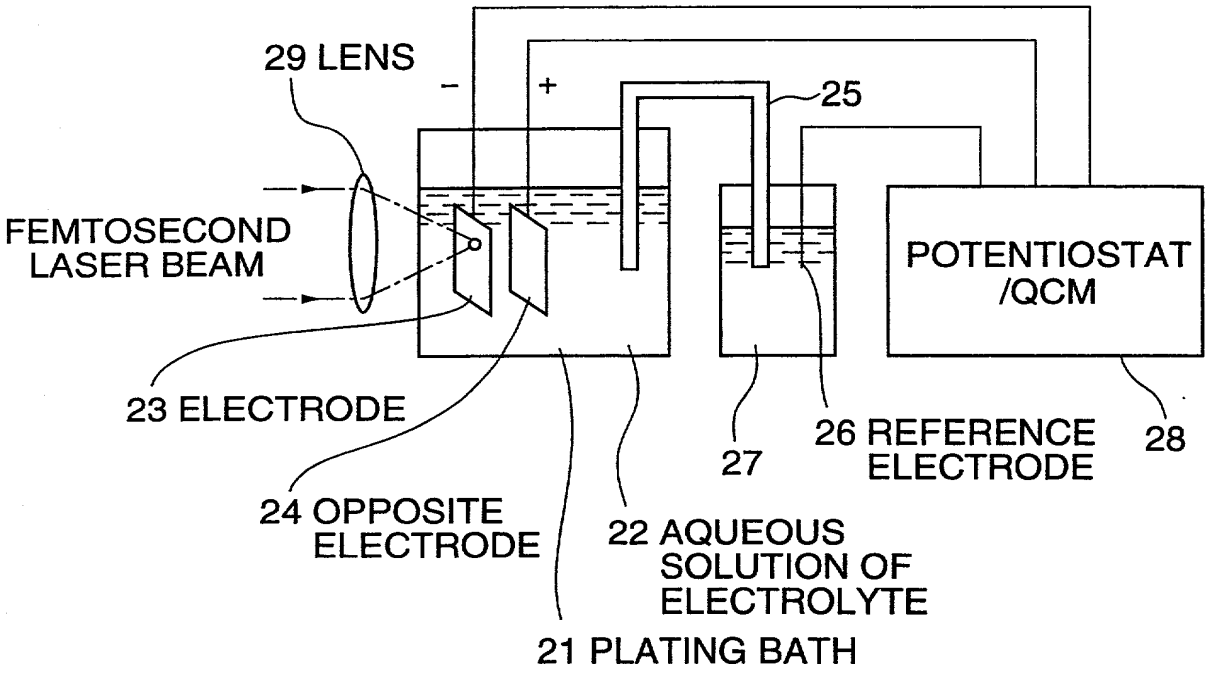

29 LENS
−
+
25
FEMTOSECOND
LASER BEAM
POTENTIOSTAT
/QCM
23 ELECTRODE
27
26 REFERENCE
ELECTRODE
28
24 OPPOSITE
ELECTRODE
22 AQUEOUS
SOLUTION OF
ELECTROLYTE
21 PLATING BATH

FIG.4

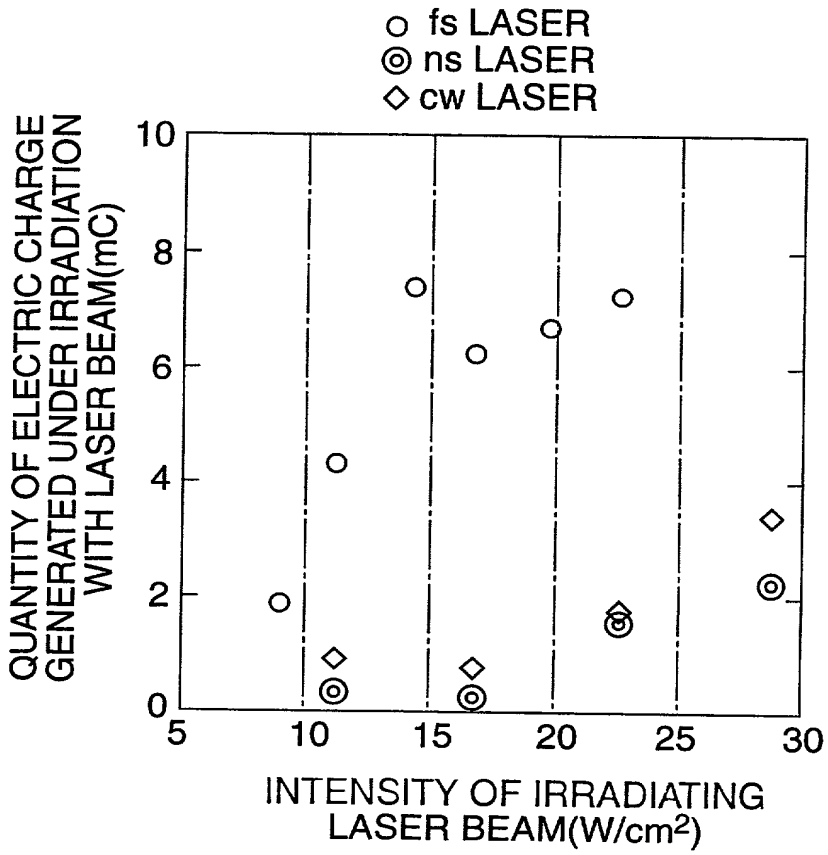

fs LASER
ns LASER
cw LASER
QUANTITY OF ELECTRIC CHARGE GENERATED UNDER IRRADIATION WITH LASER BEAM(mC)
0
2
4
6
8
10
5
10
15
20
25
30
INTENSITY OF IRRADIATING LASER BEAM(W/cm2)

FIG.5

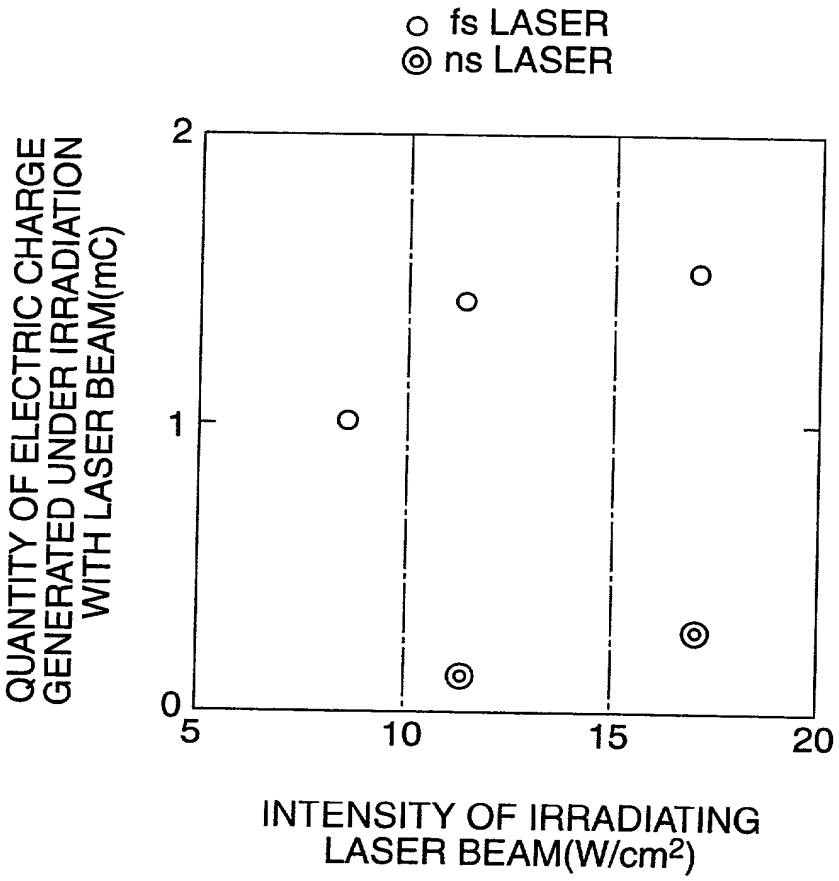

○ fs LASER
◎ ns LASER
QUANTITY OF ELECTRIC CHARGE GENERATED UNDER IRRADIATION WITH LASER BEAM(mC)
2
1
0
5
10
15
20
INTENSITY OF IRRADIATING LASER BEAM(W/cm2)

FIG.6

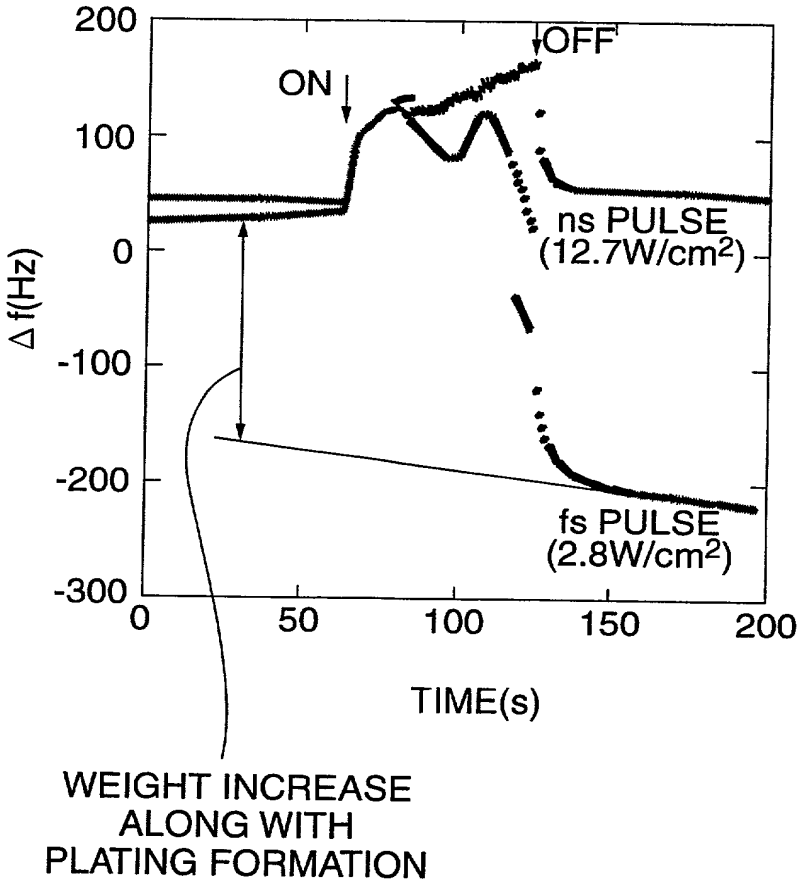

200
100
0
-100
-200
-300
Δ f(Hz)
0
50
100
150
200
TIME(s)
ON
OFF
ns PULSE
(12.7W/cm2)
fs PULSE
(2.8W/cm2)
WEIGHT INCREASE
ALONG WITH
PLATING FORMATION

FIG.7

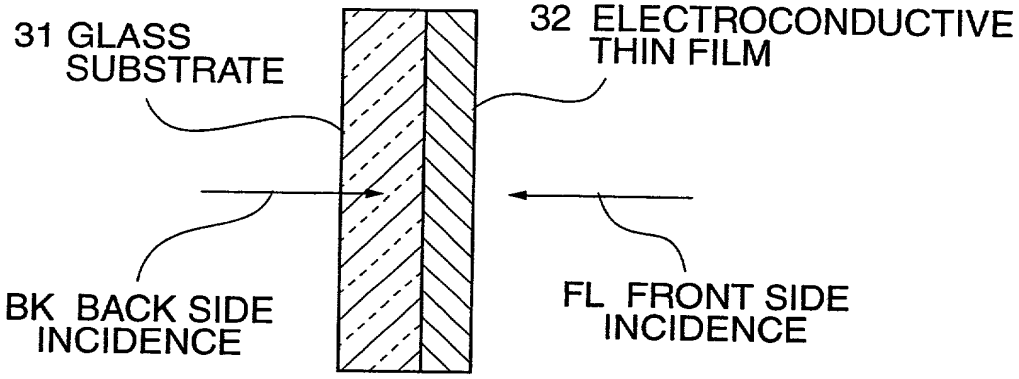
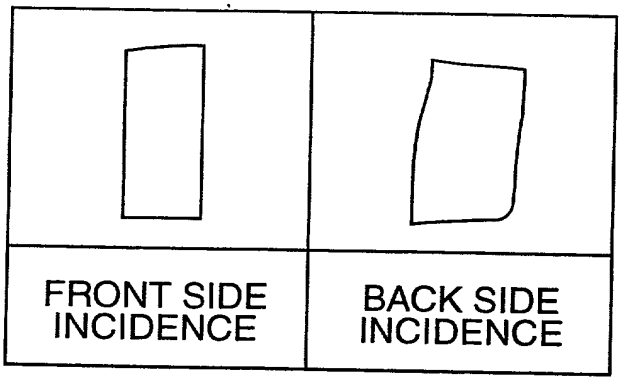


FIG.8



T1: IRRADIATION WITH SAPPHIRE LASER BEAM
(2 W/cm^2, -600mV, 150s)

FIG.9

	Cu	Ni	O	C
fs LASER INCIDENT ON FRONT SIDE	12	12	37	39
fs LASER INCIDENT ON BACK SIDE	19	0	29	52

(atomic%)

NOTE 1) COMPOSITION MAY INVOLVE ERRORS OF UP TO ABOUT 30%.
NOTE 2) ANALYSIS DEPTH OF XPS IS A FEW nm.
NOTE 3) MOST PART OF DETECTED C IS ATTRIBUTABLE TO HYDROCARBONS, WHICH CONTAMINATE SURFACE.

FIG.10

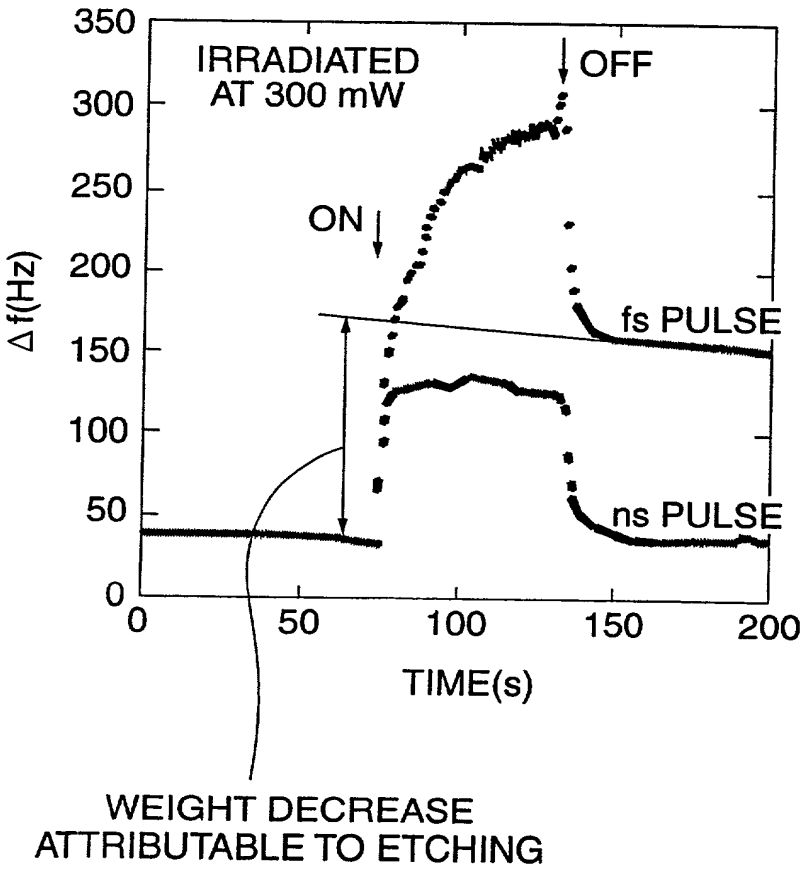

350
300
250
200
150
100
50
0
Δf(Hz)
IRRADIATED
AT 300 mW
OFF
ON
fs PULSE
ns PULSE
0
50
100
150
200
TIME(s)
WEIGHT DECREASE
ATTRIBUTABLE TO ETCHING

FIG.11A

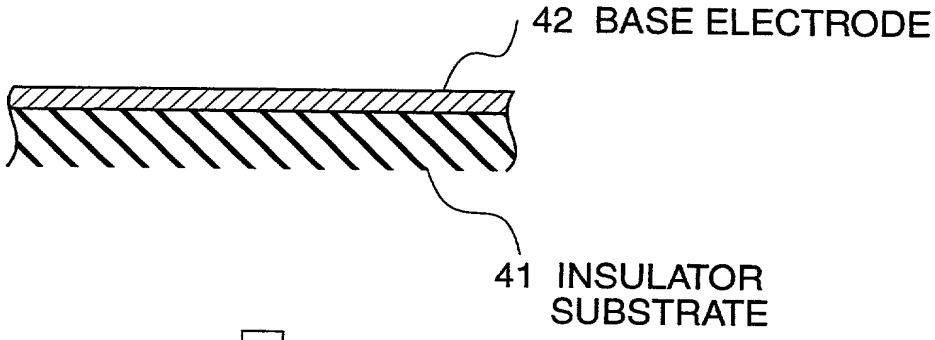


FIG.11B

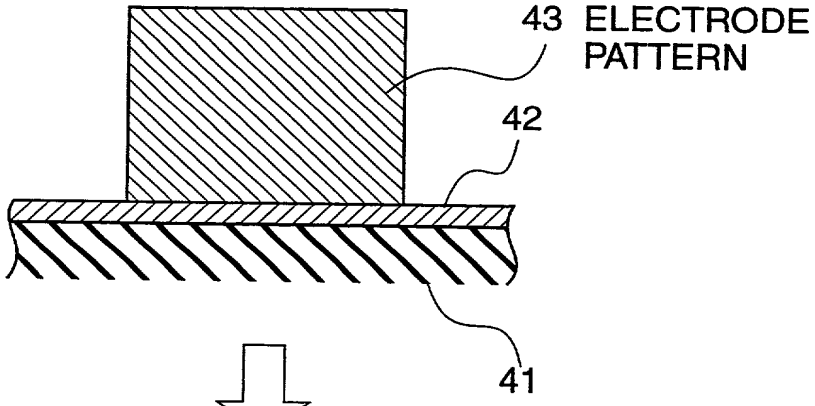
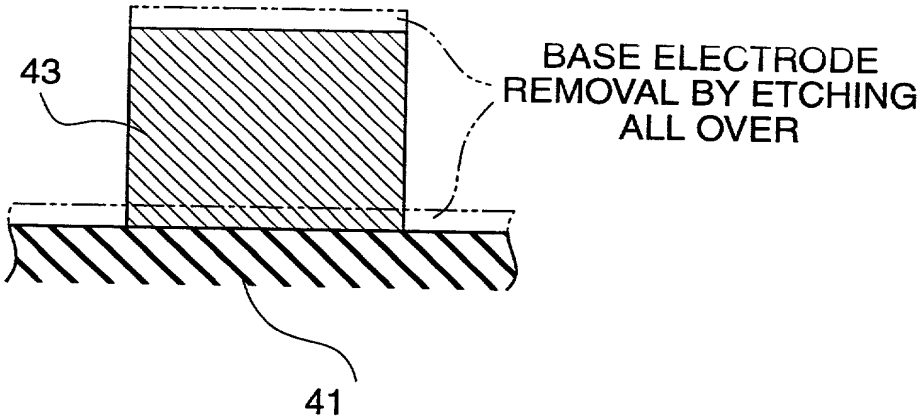


FIG.11C



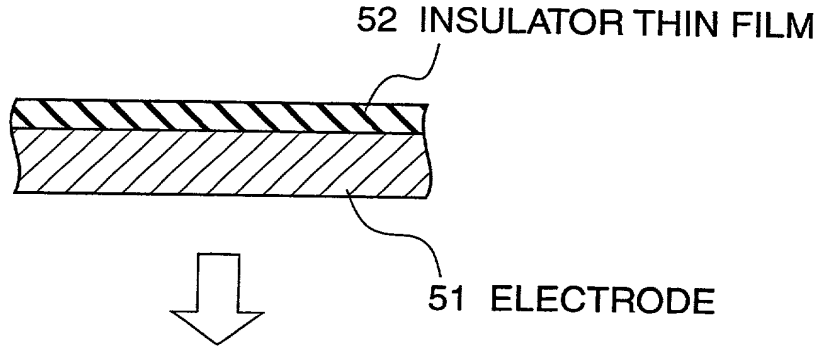


FIG.12A

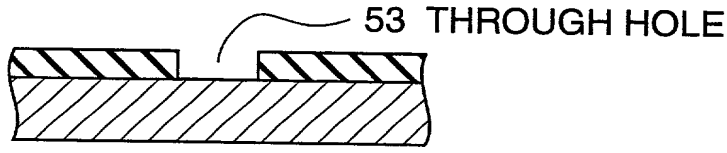


FIG.12B

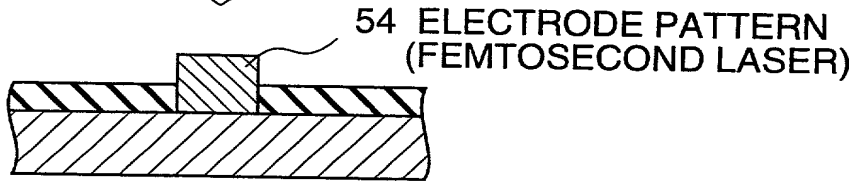


FIG.12C

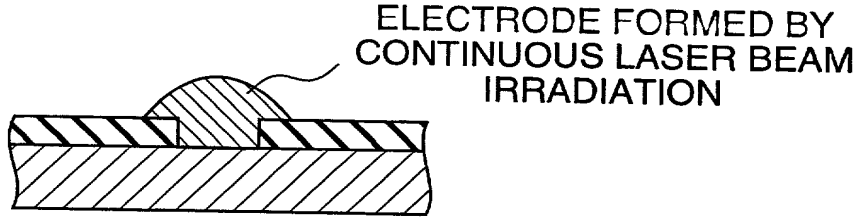
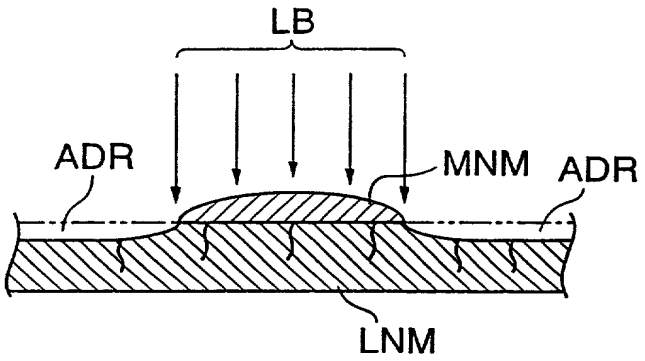


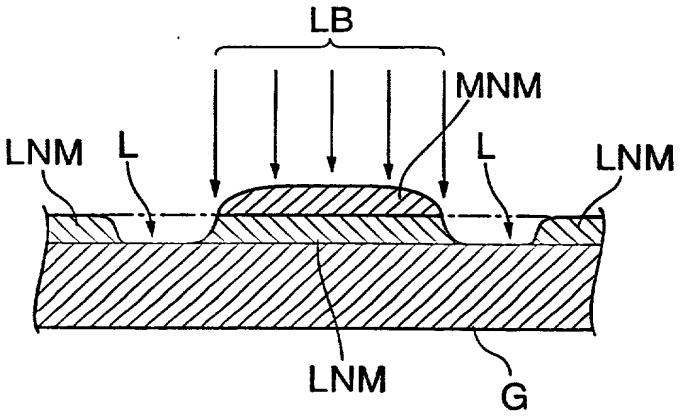
FIG.12D

FIG.13



PRIOR ART

FIG.14



PRIOR ART